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GEROS-ISS: Innovative Ocean Remote Sensing using GNSS Reflectometry onboard the International Space Station

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In response to an European Space Agency (ESA) announcement of opportunity the GEROS-ISS (GEROS hereafter) proposal was submitted in 2011 and accepted by ESA to proceed to Phase A. GEROS-ISS is an innovative ISS experiment primarily focused on exploiting reflected signals of opportunity from Global Navigation Satellite Systems (GNSS) at L-band to measure key parameters of ocean surfaces. Secondary mission goals are remote sensing of land/ice surface parameters and global atmosphere and ionosphere observations using the GNSS radio occultation technique. GEROS will pioneer the exploitation of signals from Galileo and possibly other GNSS systems (GLONASS, QZSS, Beidou), for reflectometry and occultation, thereby improving the accuracy as well as the spatio-temporal resolution of the derived geophysical properties.

GEROS will contribute to the long-term S.I. traceable observation of the variations of major climate components of the Earth System: Oceans/Hydrosphere, Cryosphere/Snow, Atmosphere/Ionosphere and solid Earth/landcover changes with innovative and complementary aspects compared to current Earth Observation satellite missions. GEROS will mainly provide mid- and low-latitude observations on submesoscale or longer oceanic variability with a focus on the coastal region, surface ocean currents, surface winds, wave heights for a period of at least ten years. These observations will lead to a better understanding of the climate system. GEROS takes advantage of the capacious infrastructure onboard the ISS for the payload setup. GEROS also provides a sensor calibration/validation option for other upcoming satellite missions including ISS-RapidScatt, CYGNSS and FormoSAT-7/COSMIC-II.

The definition of the GEROS mission and system requirements was completed end of 2013 and the industrial phase A studies are expected to start in early 2014. We overview the GEROS mission and review the status of the experiment.